



DEPARTMENT OF ENERGY

[Case Number 2021-006; EERE-2021-BT-WAV-0014]

Energy Conservation Program: Notification of Petition for Waiver of RefPlus Inc. from the Department of Energy Walk-in Coolers and Walk-in Freezers Test Procedure and Notification of Grant of Interim Waiver

AGENCY: Office of Energy Efficiency and Renewable Energy, Department of Energy.

ACTION: Notification of petition for waiver and grant of an interim waiver; request for comments.

SUMMARY: This notification announces receipt of and publishes a petition for waiver and interim waiver from RefPlus, Inc. (“RefPlus”), which seeks a waiver for specified carbon dioxide (“CO₂”) direct expansion unit cooler basic models from the U.S. Department of Energy (“DOE”) test procedure used for determining the efficiency of walk-in cooler and walk-in freezer refrigeration systems. DOE also gives notification of an Interim Waiver Order that requires RefPlus to test and rate the specified CO₂ direct expansion unit cooler basic models in accordance with the alternate test procedure set forth in the Interim Waiver Order. DOE solicits comments, data, and information concerning RefPlus’s petition and its suggested alternate test procedure so as to inform DOE’s final decision on RefPlus’s waiver request.

DATES: Written comments and information are requested and will be accepted on or before [INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE *FEDERAL REGISTER*].

ADDRESSES: Interested persons are encouraged to submit comments using the Federal eRulemaking Portal at www.regulations.gov. Alternatively, interested persons may submit comments, identified by docket number EERE–2021–BT–WAV–0014, by any of the following methods:

1. *Federal eRulemaking Portal*: www.regulations.gov. Follow the instructions for submitting comments.
2. *E-mail*: to REFPLUS2021WAV0014@ee.doe.gov. Include docket number EERE–2021–BT–WAV-0014 in the subject line of the message.

No telefacsimiles (“faxes”) will be accepted. For detailed instructions on submitting comments and additional information on this process, see the “**SUPPLEMENTARY INFORMATION**” section of this document.

Although DOE has routinely accepted public comment submissions through a variety of mechanisms, including postal mail and hand delivery/courier, the Department has found it necessary to make temporary modifications to the comment submission process in light of the ongoing Covid-19 pandemic. DOE is currently suspending receipt of public comments via postal mail and hand delivery/courier. If a commenter finds that this change poses an undue hardship, please contact Appliance Standards Program staff at (202) 586-1445 to discuss the need for alternative arrangements. Once the Covid-19 pandemic health emergency is resolved, DOE anticipates resuming all of its regular options for public comment submission, including postal mail and hand delivery/courier.

Docket: The docket, which includes *Federal Register* notices, comments, and other supporting documents/materials, is available for review at www.regulations.gov. All documents in the docket are listed in the www.regulations.gov index. However, some documents listed in the index, such as those containing information that is exempt from public disclosure, may not be publicly available.

The docket web page can be found at <https://www.regulations.gov/docket?D=EERE-2021-BT-WAV-0014>. The docket web page contains instruction on how to access all documents, including

public comments, in the docket. See the “**SUPPLEMENTARY INFORMATION**” section for information on how to submit comments through *www.regulations.gov*.

FOR FURTHER INFORMATION CONTACT:

Ms. Lucy deButts, U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Building Technologies Office, Mailstop EE-5B, 1000 Independence Avenue, SW., Washington, DC 20585-0121. E-mail: *AS_Waiver_Request@ee.doe.gov*.

Mr. Michael Kido, U.S. Department of Energy, Office of the General Counsel, Mail Stop GC-33, Forrestal Building, 1000 Independence Avenue, SW., Washington, DC 20585-0103. Telephone: (202) 586-8145. E-mail: *Michael.Kido@hq.doe.gov*.

SUPPLEMENTARY INFORMATION:

In this notice, DOE is publishing RefPlus’s petition for waiver in its entirety, pursuant to 10 CFR 431.401(b)(1)(iv)).¹ DOE is also publishing the Interim Waiver Order granted to RefPlus, which serves as notification of DOE’s determination regarding RefPlus’s petition for an interim waiver, pursuant to 10 CFR 431.401(e)(1)(ii). DOE invites all interested parties to submit in writing by **[INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE *FEDERAL REGISTER*]**, comments and information on all aspects of the petition, including the alternate test procedure. Pursuant to 10 CFR 431.401(d), any person submitting written comments to DOE must also send a copy of such comments to the petitioner. The contact information for the petitioner is Michel Lecompte, *mlecompte@refplus.com*, 2777, Grande-Allée St-Hubert, Quebec Canada, J4T 2R4.

Submitting comments via www.regulations.gov. The *www.regulations.gov* web page will require you to provide your name and contact information. Your contact information will be viewable to DOE Building Technologies staff only. Your contact information will not be publicly viewable except for your first and last names, organization name (if any), and submitter

¹ The petition did not identify any of the information contained therein as confidential business information.

representative name (if any). If your comment is not processed properly because of technical difficulties, DOE will use this information to contact you. If DOE cannot read your comment due to technical difficulties and cannot contact you for clarification, DOE may not be able to consider your comment.

However, your contact information will be publicly viewable if you include it in the comment or in any documents attached to your comment. Any information that you do not want to be publicly viewable should not be included in your comment, nor in any document attached to your comment. If this instruction is followed, persons viewing comments will see only first and last names, organization names, correspondence containing comments, and any documents submitted with the comments.

Do not submit to *www.regulations.gov* information for which disclosure is restricted by statute, such as trade secrets and commercial or financial information (hereinafter referred to as Confidential Business Information (“CBI”)). Comments submitted through *www.regulations.gov* cannot be claimed as CBI. Comments received through the website will waive any CBI claims for the information submitted. For information on submitting CBI, see the Confidential Business Information section.

DOE processes submissions made through *www.regulations.gov* before posting. Normally, comments will be posted within a few days of being submitted. However, if large volumes of comments are being processed simultaneously, your comment may not be viewable for up to several weeks. Please keep the comment tracking number that *www.regulations.gov* provides after you have successfully uploaded your comment.

Submitting comments via email. Comments and documents submitted via email also will be posted to www.regulations.gov. If you do not want your personal contact information to be publicly viewable, do not include it in your comment or any accompanying documents. Instead, provide your contact information on a cover letter. Include your first and last names, email address, telephone number, and optional mailing address. The cover letter will not be publicly viewable as long as it does not include any comments.

Include contact information each time you submit comments, data, documents, and other information to DOE. Faxes will not be accepted.

Comments, data, and other information submitted to DOE electronically should be provided in PDF (preferred), Microsoft Word or Excel, WordPerfect, or text (ASCII) file format. Provide documents that are not secured, written in English and free of any defects or viruses. Documents should not contain special characters or any form of encryption and, if possible, they should carry the electronic signature of the author.

Campaign form letters. Please submit campaign form letters by the originating organization in batches of between 50 to 500 form letters per PDF or as one form letter with a list of supporters' names compiled into one or more PDFs. This reduces comment processing and posting time.

Confidential Business Information. According to 10 CFR 1004.11, any person submitting information that he or she believes to be confidential and exempt by law from public disclosure should submit via email two well-marked copies: one copy of the document marked confidential including all the information believed to be confidential, and one copy of the document marked "non-confidential" with the information believed to be confidential deleted.

Submit these documents via email. DOE will make its own determination about the confidential status of the information and treat it according to its determination.

It is DOE's policy that all comments may be included in the public docket, without change and as received, including any personal information provided in the comments (except information deemed to be exempt from public disclosure).

Case Number 2021-006

Interim Waiver Order

I. Background and Authority

The Energy Policy and Conservation Act, as amended ("EPCA"),² authorizes the U.S. Department of Energy ("DOE") to regulate the energy efficiency of a number of consumer products and certain industrial equipment. (42 U.S.C. 6291–6317). Title III, Part C³ of EPCA, Public Law 94-163 (42 U.S.C. 6291-6309, as codified), added by the National Energy Conservation Policy Act, Public Law 95-619, sec. 441 (Nov. 9, 1978), established the Energy Conservation Program for Certain Industrial Equipment, which sets forth a variety of provisions designed to improve energy efficiency for certain types of industrial equipment. Through amendments brought about by the Energy Independence and Security Act of 2007, Pub. L. 110-140, sec. 312 (Dec. 19, 2007), this equipment includes walk-in coolers and walk-in freezers (collectively "walk-ins"), the subject of this Interim Waiver Order. (42 U.S.C. 6311(1)(G)).

² All references to EPCA in this document refer to the statute as amended through the Energy Act of 2020, Public Law 116-260 (Dec. 27, 2020).

³ For editorial reasons, upon codification in the U.S. Code, Part C was redesignated as Part A-1.

The energy conservation program under EPCA consists essentially of four parts: (1) testing, (2) labeling, (3) Federal energy conservation standards, and (4) certification and enforcement procedures. Relevant provisions of EPCA include definitions (42 U.S.C. 6311), energy conservation standards (42 U.S.C. 6313), test procedures (42 U.S.C. 6314), labeling provisions (42 U.S.C. 6315), and the authority to require information and reports from manufacturers (42 U.S.C. 6316).

The Federal testing requirements consist of test procedures that manufacturers of covered equipment must use as the basis for: (1) certifying to DOE that their equipment complies with the applicable energy conservation standards adopted pursuant to EPCA (42 U.S.C. 6316(a); 42 U.S.C. 6295(s)), and (2) making representations about the efficiency of that equipment (42 U.S.C. 6314(d)). Similarly, DOE must use these test procedures to determine whether the covered equipment complies with relevant standards promulgated under EPCA. (42 U.S.C. 6316(a); 42 U.S.C. 6295(s)).

Under 42 U.S.C. 6314, EPCA sets forth the criteria and procedures DOE is required to follow when prescribing or amending test procedures for covered equipment. EPCA requires that any test procedures prescribed or amended under this section must be reasonably designed to produce test results which reflect the energy efficiency, energy use or estimated annual operating cost of covered equipment during a representative average use cycle and requires that test procedures not be unduly burdensome to conduct. (42 U.S.C. 6314(a)(2)) The test procedure for walk-in refrigeration systems is contained in the Code of Federal Regulations (“CFR”) at 10 CFR part 431, subpart R, appendix C, *Uniform Test Method for the Measurement of Net Capacity and AWEF of Walk-In Cooler and Walk-In Freezer Refrigeration Systems* (“Appendix C”).

Under 10 CFR 431.401, any interested person may submit a petition for waiver from DOE's test procedure requirements. DOE will grant a waiver from the test procedure requirements if DOE determines either that the basic model for which the waiver was requested contains a design characteristic that prevents testing of the basic model according to the prescribed test procedures, or that the prescribed test procedures evaluate the basic model in a manner so unrepresentative of its true energy consumption characteristics as to provide materially inaccurate comparative data. 10 CFR 431.401(f)(2). A petitioner must include in its petition any alternate test procedures known to the petitioner to evaluate the performance of the product type in a manner representative of the energy consumption characteristics of the basic model. 10 CFR 431.401(b)(1)(iii). DOE may grant the waiver subject to conditions, including adherence to alternate test procedures. 10 CFR 431.401(f)(2).

As soon as practicable after the granting of any waiver, DOE will publish in the *Federal Register* a notice of proposed rulemaking to amend its regulations so as to eliminate any need for the continuation of such waiver. 10 CFR 431.401(l). As soon thereafter as practicable, DOE will publish in the *Federal Register* a final rule to that effect. *Id.*

The waiver process also provides that DOE may grant an interim waiver if it appears likely that the underlying petition for waiver will be granted and/or if DOE determines that it would be desirable for public policy reasons to grant immediate relief pending a determination on the underlying petition for waiver. 10 CFR 431.401(e)(2). Within one year of issuance of an interim waiver, DOE will either: (i) publish in the *Federal Register* a determination on the petition for waiver; or (ii) publish in the *Federal Register* a new or amended test procedure that addresses the issues presented in the waiver. 10 CFR 431.401(h)(1).

If DOE ultimately denies the petition for waiver, or if the alternate test procedure specified in the interim waiver differs from the alternate test procedure specified by DOE in a subsequent Decision and Order, DOE will provide a period of 180 days before the manufacturer is required to use the DOE test procedure or the alternate test procedure specified in the Decision and Order to make representations of energy efficiency. 10 CFR 431.401(i).⁴ When DOE amends the test procedure to address the issues presented in a waiver, the waiver will automatically terminate on the date on which use of that test procedure is required to demonstrate compliance. 10 CFR 431.401(h)(3).

II. RefPlus's Petition for Waiver and Interim Waiver

On June 2, 2021, DOE received⁵ from RefPlus a petition for waiver and interim waiver from the test procedure for walk-in refrigeration systems set forth at 10 CFR part 431, subpart R, appendix C. (RefPlus, No. 1 at p. 1⁶). DOE received an updated petition for waiver and interim waiver from RefPlus on July 12, 2021. (RefPlus, No. 2 at p. 1). The updated petition specifies additional basic models to be considered under the waiver request. (RefPlus, No. 2 at pp. 2-5). Pursuant to 10 CFR 431.401(b)(1)(iv), DOE has posted both petitions to the docket at, at: www.regulations.gov/docket/EERE-2021-BT-WAV-0014 and has reproduced the most recent petition for waiver in this notice.⁷

⁴ In proposing an amendment to 10 CFR 431.401(i), DOE stated that - “The 180 day duration was proposed because that time frame is consistent with the EPCA provision that provides manufacturers 180 days from issuance of a new or amended test procedure to begin using that test procedure for representation of energy efficiency.” 84 FR 18414, 18416 (May 1, 2019); (See 42 U.S.C. 6293(c)(2)). In the final rule published December 11, 2020, stated that it was maintaining the 180-day grace period as proposed. 85 FR 79802, 79813. As such, were a Decision and Order issued with an alternate test procedure that differed from that required under this interim waiver, beginning 180 days following publication of the Decision and Order any representations made by the petitioner must fairly disclose the results of testing in accordance with the alternate test procedure specified by the final Order and the applicable requirements of 10 CFR part 429.

⁵ A petition submitted under 10 CFR 431.401 is considered “received” on the date it is received by DOE through DOE’s established email box for receipt of waiver petitions or, if delivered by mail, on the date the waiver petition is stamped as received by DOE. 10 CFR 431.401(e)(1)(iii).

⁶ A notation in the form “RefPlus, No. 1” identifies a written submission: (1) made by RefPlus; and (2) recorded in document number 1 that is filed in the docket of this petition for waiver (Docket No. EERE-2021-BT-WAV-0014) and available at www.regulations.gov/docket?D=EERE-2021-BT-WAV-0014.

⁷ The petition did not identify any of the information contained therein as confidential business information.

RefPlus claims that the test conditions described in Table 15 and Table 16 of the Air-Conditioning, Heating, and Refrigeration Institute (“AHRI”) Standard 1250-2009, *Standard for Performance Rating of Walk-In Coolers and Freezers* (“AHRI 1250-2009”) (for walk-in refrigerator unit coolers and freezer unit coolers tested alone, respectively), as incorporated by Appendix C with modification, cannot be achieved by the specified basic models and are not consistent with the operation of RefPlus’s CO₂ direct expansion unit coolers. RefPlus also stated that CO₂ has a critical temperature of 87.8 °F⁸, and thus the required liquid inlet saturation temperature of 105 °F and the required liquid inlet subcooling temperature of 9 °F are not achievable, and that the test conditions should be more consistent with typical operating conditions for a transcritical CO₂ booster system (RefPlus, No. 2, p. 5).

The statements made by RefPlus reference the difference in thermodynamic properties between CO₂ and other refrigerants. Many substances transition from a solid to a liquid to a gas at a given pressure as temperature increases. For example, a pure substance like water transitions from liquid to steam at a specific temperature, *e.g.* 212 °F, at atmospheric pressure. As heat is added during a liquid to gas transition, the temperature remains constant and the substance coexists as both liquid and vapor. Continuing to add heat converts more of the liquid to vapor at a constant temperature. The reverse occurs when heat is removed. However, the transition temperature depends on the pressure – the higher the pressure, the higher the transition temperature. This is a key principle in refrigeration systems, which operate at two pressure levels associated with two temperatures. A refrigerant absorbs heat when it is at a low temperature and pressure, converting to gas and cooling the surrounding space. At high

⁸ The test procedure specifies the unit cooler refrigerant inlet condition in terms of a saturation temperature (the temperature at which it completes the condensation process in a condenser) and the subcooling temperature (additional reduction in temperature lower than the specified saturation temperature). For CO₂, the critical temperature above which there cannot exist separate liquid and gas phases is below the saturation condition specified in the test procedure, hence the specified condition cannot be achieved.

temperature and pressure, the refrigerant transitions to a liquid while releasing heat to the environment. A compressor is used to raise a gas from low- high-pressure, and a throttle (pressure reduction device) is used to reduce the pressure once the refrigerant has been fully liquefied (condensed) at high pressure.

All refrigerants have a “critical temperature” and an associated “critical pressure” above which liquid and vapor phases cannot coexist. Above this critical point, the refrigerant will be a gas and its temperature will increase or decrease as heat is added or removed. For conventional refrigerants, the critical temperature is never exceeded in typical refrigeration cycles. For example, R404A is a common refrigerant used in refrigeration systems and has a critical temperature of 161.7 °F with an associated critical pressure of 540.8 psia.⁹ However, CO₂ behaves differently, with a critical temperature of 87.8 °F and an associated critical pressure of 1,072 psia. The refrigerant temperature must be somewhat higher than the ambient temperature in order to reject refrigeration cycle heat to the ambient environment. Ambient temperatures greater than 87.8 °F are common and the performance of many refrigeration and air conditioning systems are tested using a 95 °F ambient temperature, as indicated by the A test condition in AHRI 1250-2009 Section 5. Above the critical temperature and critical pressure, the CO₂ refrigerant is in a supercritical state and heat is transferred to the environment. Since the temperature of the CO₂ refrigerant ranges from supercritical to subcritical within the system, CO₂ cycles are said to be “transcritical.”

The transcritical nature of CO₂ generally requires a more complex refrigeration cycle design to approach the efficiency of traditional refrigerants (i.e., R404A, R407A, R448A, etc.) during operation in high temperature conditions. To increase efficiency and prevent overheating,

⁹ Absolute pressure is the pressure measured relative to a complete vacuum; “psia” represents the absolute pressure in pounds per square inch.

transcritical booster systems introduce (or use) multiple stages of compression and intercooling. CO₂ is cooled in the gas cooler of a transcritical booster system, then expands through a high-pressure control valve and is delivered to a subcritical-pressure flash tank. In the flash tank, the refrigerant is in the subcritical phase and the liquid and vapor phases can be separated. In a CO₂ booster system, subcooled liquid refrigerant from the flash tank supplies the unit cooler via expansion valves where the refrigerant is evaporated. The evaporated refrigerant is subsequently compressed up to gas cooler pressure to complete the cycle (Docket EERE-2021-BT-WAV-0014, No. 5).

As noted, RefPlus requests an interim waiver from the existing DOE test procedure. DOE will review the petition for interim waiver within 45 business days of receipt of the petition. 10 CFR 431.401(e)(1)(ii). If DOE does not notify the applicant of the disposition of the petition for interim waiver, in writing, within 45 business days of receipt of the petition, the interim waiver is granted utilizing the alternate test procedure requested in the petition. *Id.* DOE will grant an interim waiver if it appears likely that the petition for waiver will be granted, and/or if DOE determines that it would be desirable for public policy reasons to grant immediate relief pending a determination of the petition for waiver. 10 CFR 431.401(e)(2).

Based on the assertions in the petition, absent an interim waiver, the prescribed test procedure is not appropriate for RefPlus's CO₂ direct expansion unit coolers and the test conditions are not achievable. As discussed, CO₂ refrigerant has a critical temperature of 87.8 °F and the current DOE test procedure calls for a liquid inlet saturation temperature of 105°F. The inability to achieve test conditions for the stated basic models would result in economic hardship from loss of sales stemming from the inability of the DOE test procedure to address the

operating conditions of RefPlus's equipment. DOE has published decision and orders granting a waiver for other equipment relying on the same technology.¹⁰

III. Requested Alternate Test Procedure

EPCA requires that manufacturers use DOE test procedures when making representations about the energy consumption and energy consumption costs of covered equipment. (42 U.S.C. 6314(d)). Consistency is important when making representations about the energy efficiency of covered equipment, including when demonstrating compliance with applicable DOE energy conservation standards. Pursuant to 10 CFR 431.401, and after consideration of public comments on the petition, DOE may establish in a subsequent Decision and Order an alternate test procedure for the basic models addressed by the Interim Waiver Order.

RefPlus seeks to use an alternate test procedure to test and rate specific CO₂ direct expansion unit cooler basic models. RefPlus's suggested approach specifies using modified liquid inlet saturation and liquid inlet subcooling temperatures of 38°F and 5°F, respectively, for both walk-in refrigerator unit coolers and walk-in freezer unit coolers. (RefPlus, No. 2 at p. 5). Additionally, RefPlus recommended that because the subject units are used in transcritical CO₂ booster systems, the calculations in AHRI 1250-2009 section 7.9 should be used to determine Annual Walk-in Efficiency Factor ("AWEF") and net capacity for unit coolers matched to parallel rack systems as required under the DOE test procedure. (RefPlus, No. 2 at pp. 5-6). This section of AHRI 1250-2009 is prescribed by the DOE test procedure for determining AWEF for all unit coolers tested alone (see 10 CFR part 431, subpart R, appendix C, section 3.3.1). Finally, RefPlus also recommended that AHRI 1250-2009 Table 17, EER for Remote

¹⁰ See Notice of Decision and Order granting a waiver to HTPG (Case No. 2020-009; 86 FR 14887 (Mar. 19, 2021)); Notice of Decision and Order granting a waiver to Hussmann (Case No. 2020-010; 86 FR 24606 (May 7, 2021)); Notice of Decision and Order granting a waiver to KeepRite (Case No. 2020-014; 86 FR 24603 (May 7, 2021)).

Commercial Refrigerated Display Merchandisers and Storage Cabinets, should be used to determine power consumption of CO₂ direct expansion unit cooler systems as required under the DOE test procedure (RefPlus, No. 2 at p. 5).

IV. Interim Waiver Order

DOE has reviewed RefPlus's application for an interim waiver, the alternate test procedure requested by RefPlus, and the websites and product specification sheets for the basic models listed in RefPlus's petition. Based on this review, the suggested alternate test procedure appears to allow for the accurate measurement of the energy efficiency of the specified basic models, while alleviating the testing issues associated with RefPlus's implementation of walk-in cooler and walk-in freezer testing for these basic models. Review of the CO₂ refrigeration market confirms that the testing conditions and approach suggested by RefPlus would be representative for operation of a unit cooler used in a transcritical CO₂ booster system (Docket EERE-2021-BT-WAV-0014, No. 4). Specifically, CO₂ that is cooled in the gas cooler of a transcritical booster system expands through a high-pressure control valve that delivers CO₂ to a subcritical-pressure flash tank, where liquid and vapor phases of the refrigerant are separated. The liquid is then split, and the unit coolers receive the refrigerant at the same condition, consistent with the use of the same liquid inlet saturation temperature for both the medium- and low-temperature systems in RefPlus's suggested test approach. Calculations on other external CO₂ refrigeration system designs in the market indicate that the 38 °F liquid unit cooler inlet saturation temperature suggested by RefPlus is representative of CO₂ booster systems (Docket EERE-2021-BT-WAV-0014, No. 5). Regarding use of the EER values in AHRI 1250-2009 Table 17 to determine the representative compressor power consumption for CO₂ unit cooler systems, research into the performance of different configurations of CO₂ booster systems shows that enhanced CO₂ cycles (like those used in transcritical booster systems) can match conventional refrigerants in average annual efficiency (Docket EERE-2021-BT-WAV-0014, No.

3). The findings from this research, along with the other collective factors previously noted, justify the use of the EER values in AHRI 1250-2009 Table 17 for determining the power consumption for CO2 booster system evaporators, despite these EER values being initially established for systems using conventional refrigerants. Consequently, DOE has determined that RefPlus's petition for waiver likely will be granted. Furthermore, DOE has determined that it is desirable for public policy reasons to grant RefPlus immediate relief pending a determination of the petition for waiver.

For the reasons stated, it is **ORDERED** that:

(1) RefPlus must test and rate the following RefPlus-branded, CO2 direct expansion unit cooler basic models with the alternate test procedure set forth in paragraph (2).

Basic Model Numbers:

LAA-0607-1	LAE-0577-2	LAG-0577-1	LAH-0577-1	LPA-0607-1	LPE-0577-2	LPG-0577-1	LPH-0577-1
LAA-0607-2	LAE-0577-5	LAG-0577-2	LAH-0577-2	LPA-0607-2	LPE-0577-5	LPG-0577-2	LPH-0577-2
LAA-0757-1	LAE-0727-2	LAG-0727-1	LAH-0727-1	LPA-0707-1	LPE-0677-2	LPG-0677-1	LPH-0677-1
LAA-0757-2	LAE-0727-5	LAG-0727-2	LAH-0727-2	LPA-0707-2	LPE-0677-5	LPG-0677-2	LPH-0677-2
LAA-0957-1	LAE-0907-2	LAG-0907-1	LAH-0907-1	LPA-0807-1	LPE-0767-2	LPG-0767-1	LPH-0767-1
LAA-0957-2	LAE-0907-5	LAG-0907-2	LAH-0907-2	LPA-0807-2	LPE-0767-5	LPG-0767-2	LPH-0767-2
LAA-1207-1	LAE-1147-2	LAG-1147-1	LAH-1147-1	LPA-1007-1	LPE-0957-2	LPG-0957-1	LPH-0957-1
LAA-1207-2	LAE-1147-5	LAG-1147-2	LAH-1147-2	LPA-1007-2	LPE-0957-5	LPG-0957-2	LPH-0957-2
LAA-1507-1	LAE-1437-2	LAG-1437-1	LAH-1437-1	LPA-1207-1	LPE-1157-2	LPG-1157-1	LPH-1157-1
LAA-1507-2	LAE-1437-5	LAG-1437-2	LAH-1437-2	LPA-1207-2	LPE-1157-5	LPG-1157-2	LPH-1157-2
LAA-1807-1	LAE-1707-2	LAG-1707-1	LAH-1707-1	LPA-1607-1	LPE-1527-2	LPG-1527-1	LPH-1527-1
LAA-1807-2	LAE-1707-5	LAG-1707-2	LAH-1707-2	LPA-1607-2	LPE-1527-5	LPG-1527-2	LPH-1527-2
LAA-2407-1	LAE-2307-2	LAG-2307-1	LAH-2307-1	LPA-2007-1	LPE-1907-2	LPG-1907-1	LPH-1907-1
LAA-2407-2	LAE-2307-5	LAG-2307-2	LAH-2307-2	LPA-2007-2	LPE-1907-5	LPG-1907-2	LPH-1907-2
LAA-2807-1	LAE-2707-2	LAG-2707-1	LAH-2707-1	LPA-2107-1	LPE-2007-2	LPG-2007-1	LPH-2007-1
LAA-2807-2	LAE-2707-5	LAG-2707-2	LAH-2707-2	LPA-2107-2	LPE-2007-5	LPG-2007-2	LPH-2007-2
LAA-3007-1	LAE-2867-2	LAG-2867-1	LAH-2867-1	LPA-2407-1	LPE-2307-2	LPG-2307-1	LPH-2307-1
LAA-3007-2	LAE-2867-5	LAG-2867-2	LAH-2867-2	LPA-2407-2	LPE-2307-5	LPG-2307-2	LPH-2307-2
LAA-3607-1	LAE-3437-2	LAG-3437-1	LAH-3437-1	LPA-2807-1	LPE-2707-2	LPG-2707-1	LPH-2707-1
LAA-3607-2	LAE-3437-5	LAG-3437-2	LAH-3437-2	LPA-2807-2	LPE-2707-5	LPG-2707-2	LPH-2707-2
LAA-4207-1	LAE-4007-2	LAG-4007-1	LAH-4007-1	LPA-3507-1	LPE-3347-2	LPG-3347-1	LPH-3347-1
LAA-4207-2	LAE-4007-5	LAG-4007-2	LAH-4007-2	LPA-3507-2	LPE-3347-5	LPG-3347-2	LPH-3347-2

LAA-4607-1	LAE-4387-2	LAG-4387-1	LAH-4387-1	LPA-4207-1	LPE-4007-2	LPG-4007-1	LPH-4007-1
LAA-4607-2	LAE-4387-5	LAG-4387-2	LAH-4387-2	LPA-4207-2	LPE-4007-5	LPG-4007-2	LPH-4007-2
LSA-0457-1	LSE-0437-2	LSR-0437-1	LST-0437-1	LVA-0707-1	LVA-3607-2	LVG-0707-1	LVH-0707-1
LSA-0457-2	LSE-0437-5	LSR-0437-2	LST-0437-2	LVA-0707-2	LVA-3607-5	LVG-0707-2	LVH-0707-2
LSA-0557-1	LSE-0527-2	LSR-0527-1	LST-0527-1	LVA-0707-5	LVA-4207-1	LVG-0807-1	LVH-0807-1
LSA-0557-2	LSE-0527-5	LSR-0527-2	LST-0527-2	LVA-0807-1	LVA-4207-2	LVG-0807-2	LVH-0807-2
LSA-0657-1	LSE-0627-2	LSR-0627-1	LST-0627-1	LVA-0807-2	LVA-4207-5	LVG-0907-1	LVH-0907-1
LSA-0657-2	LSE-0627-5	LSR-0627-2	LST-0627-2	LVA-0807-5	LVE-0707-2	LVG-0907-2	LVH-0907-2
LSA-0757-1	LSE-0727-2	LSR-0727-1	LST-0727-1	LVA-0907-1	LVE-0707-5	LVG-1207-1	LVH-1207-1
LSA-0757-2	LSE-0727-5	LSR-0727-2	LST-0727-2	LVA-0907-2	LVE-0807-2	LVG-1207-2	LVH-1207-2
LSA-0927-1	LSE-0887-2	LSR-0887-1	LST-0887-1	LVA-0907-5	LVE-0807-5	LVG-1507-1	LVH-1507-1
LSA-0927-2	LSE-0887-5	LSR-0887-2	LST-0887-2	LVA-1207-1	LVE-0907-2	LVG-1507-2	LVH-1507-2
LSA-1087-1	LSE-1037-2	LSR-1037-1	LST-1037-1	LVA-1207-2	LVE-0907-5	LVG-1907-1	LVH-1907-1
LSA-1087-2	LSE-1037-5	LSR-1037-2	LST-1037-2	LVA-1207-5	LVE-1207-2	LVG-1907-2	LVH-1907-2
LSA-1307-1	LSE-1247-2	LSR-1247-1	LST-1247-1	LVA-1507-1	LVE-1207-5	LVG-2407-1	LVH-2407-1
LSA-1307-2	LSE-1247-5	LSR-1247-2	LST-1247-2	LVA-1507-2	LVE-1507-2	LVG-2407-2	LVH-2407-2
LSA-1407-1	LSE-1337-2	LSR-1337-1	LST-1337-1	LVA-1507-5	LVE-1507-5	LVG-2707-1	LVH-2707-1
LSA-1407-2	LSE-1337-5	LSR-1337-2	LST-1337-2	LVA-1907-1	LVE-1907-2	LVG-2707-2	LVH-2707-2
LSA-1607-1	LSE-1527-2	LSR-1527-1	LST-1527-1	LVA-1907-2	LVE-1907-5	LVG-3007-1	LVH-3007-1
LSA-1607-2	LSE-1527-5	LSR-1527-2	LST-1527-2	LVA-1907-5	LVE-2407-2	LVG-3007-2	LVH-3007-2
LSA-1907-1	LSE-1807-2	LSR-1807-1	LST-1807-1	LVA-2407-1	LVE-2407-5	LVG-3607-1	LVH-3607-1
LSA-1907-2	LSE-1807-5	LSR-1807-2	LST-1807-2	LVA-2407-2	LVE-2707-2	LVG-3607-2	LVH-3607-2
LSA-2307-1	LSE-2207-2	LSR-2207-1	LST-2207-1	LVA-2407-5	LVE-2707-5	LVG-4207-1	LVH-4207-1
LSA-2307-2	LSE-2207-5	LSR-2207-2	LST-2207-2	LVA-2707-1	LVE-2707-8	LVG-4207-2	LVH-4207-2
LSA-2607-1	LSE-2407-2	LSR-2407-1	LST-2407-1	LVA-2707-2	LVE-2707-9		
LSA-2607-2	LSE-2407-5	LSR-2407-2	LST-2407-2	LVA-2707-5	LVE-3007-2		
LSA-3207-1	LSE-3007-2	LSR-3007-1	LST-3007-1	LVA-3007-1	LVE-3007-5		
LSA-3207-2	LSE-3007-5	LSR-3007-2	LST-3007-2	LVA-3007-2	LVE-3607-2		
LSA-3907-1	LSE-3707-2	LSR-3707-1	LST-3707-1	LVA-3007-5	LVE-3607-5		
LSA-3907-2	LSE-3707-5	LSR-3707-2	LST-3707-2	LVA-3607-1	LVE-4207-2		
					LVE-4207-5		
EJA-02600A-5	EJE-02500A-5	EJG-02600A-5	EJH-02600A-5	EJR-02600A-5	EJT-02600A-5	EQA-04900A-5	EQE-04800A-5
EJA-02600A-9	EJE-02500A-9	EJG-02600A-9	EJH-02600A-9	EJR-02600A-9	EJT-02600A-9	EQA-04900A-9	EQE-04800A-9
EJA-03200A-5	EJE-03100A-5	EJG-03200A-5	EJH-03200A-5	EJR-03200A-5	EJT-03200A-5	EQA-05800A-5	EQE-05700A-5
EJA-03200A-9	EJE-03100A-9	EJG-03200A-9	EJH-03200A-9	EJR-03200A-9	EJT-03200A-9	EQA-05800A-9	EQE-05700A-9
EJA-03800A-5	EJE-03700A-5	EJG-03800A-5	EJH-03800A-5	EJR-03800A-5	EJT-03800A-5	EQA-06800A-5	EQE-06700A-5
EJA-03800A-9	EJE-03700A-9	EJG-03800A-9	EJH-03800A-9	EJR-03800A-9	EJT-03800A-9	EQA-06800A-9	EQE-06700A-9
EJA-05200A-5	EJE-05100A-5	EJG-05200A-5	EJH-05200A-5	EJR-05200A-5	EJT-05200A-5	EQA-09900A-5	EQE-09600A-5
EJA-05200A-9	EJE-05100A-9	EJG-05200A-9	EJH-05200A-9	EJR-05200A-9	EJT-05200A-9	EQA-09900A-9	EQE-09600A-9
EJA-06300A-5	EJE-06200A-5	EJG-06300A-5	EJH-06300A-5	EJR-06300A-5	EJT-06300A-5	EQA-11600A-5	EQE-11500A-5
EJA-06300A-9	EJE-06200A-9	EJG-06300A-9	EJH-06300A-9	EJR-06300A-9	EJT-06300A-9	EQA-11600A-9	EQE-11500A-9
EJA-07700A-5	EJE-07600A-5	EJG-07700A-5	EJH-07700A-5	EJR-07700A-5	EJT-07700A-5	EQA-13600A-5	EQE-13400A-5
EJA-07700A-9	EJE-07600A-9	EJG-07700A-9	EJH-07700A-9	EJR-07700A-9	EJT-07700A-9	EQA-13600A-9	EQE-13400A-9
EJA-09500A-5	EJE-09300A-5	EJG-09500A-5	EJH-09500A-5	EJR-09500A-5	EJT-09500A-5	EQA-17500A-5	EQE-17200A-5
EJA-09500A-9	EJE-09300A-9	EJG-09500A-9	EJH-09500A-9	EJR-09500A-9	EJT-09500A-9	EQA-17500A-9	EQE-17200A-9
EJA-11600A-5	EJE-11500A-5	EJG-11600A-5	EJH-11600A-5	EJR-11600A-5	EJT-11600A-5	EQA-20400A-5	EQE-20300A-5
EJA-11600A-9	EJE-11500A-9	EJG-11600A-9	EJH-11600A-9	EJR-11600A-9	EJT-11600A-9	EQA-20400A-9	EQE-20300A-9
EJA-12700A-5	EJE-15300A-5	EJG-12700A-5	EJH-12700A-5	EJR-12700A-5	EJT-12700A-5	EQA-23400A-5	EQE-26800A-5

EJA-12700A-9	EJE-15300A-9	EJG-12700A-9	EJH-12700A-9	EJR-12700A-9	EJT-12700A-9	EQA-23400A-9	EQE-26800A-9
EJA-15400A-5	EJE-19000A-5	EJG-15400A-5	EJH-15400A-5	EJR-15400A-5	EJT-15400A-5	EQA-26500A-5	EQE-33700A-5
EJA-15400A-9	EJE-19000A-9	EJG-15400A-9	EJH-15400A-9	EJR-15400A-9	EJT-15400A-9	EQA-26500A-9	EQE-33700A-9
EJA-19400A-5		EJG-19400A-5	EJH-19400A-5	EJR-19400A-5	EJT-19400A-5	EQA-34200A-5	
EJA-19400A-9		EJG-19400A-9	EJH-19400A-9	EJR-19400A-9	EJT-19400A-9	EQA-34200A-9	
EJA-21000A-5		EJG-21000A-5	EJH-21000A-5	EJR-21000A-5	EJT-21000A-5	EQA-44400A-5	
EJA-21000A-9		EJG-21000A-9	EJH-21000A-9	EJR-21000A-9	EJT-21000A-9	EQA-44400A-9	
EQG-04900A-5	EQH-04900A-5	EQR-04900A-5	EQT-04900A-5	EKA-1400-2	EKE-2200-5	EKR-4000-5	EMA-02150-2
EQG-04900A-9	EQH-04900A-9	EQR-04900A-9	EQT-04900A-9	EKA-1600-2	EKE-2900-2	EKR-5000-2	EMA-02150-5
EQG-05800A-5	EQH-05800A-5	EQR-05800A-5	EQT-05800A-5	EKA-1800-2	EKE-2900-5	EKR-5000-5	EMA-02550-2
EQG-05800A-9	EQH-05800A-9	EQR-05800A-9	EQT-05800A-9	EKA-2100-2	EKE-3400-2	EKR-6000-2	EMA-02550-5
EQG-06800A-5	EQH-06800A-5	EQR-06800A-5	EQT-06800A-5	EKA-2100-5	EKE-3400-5	EKR-6000-5	EMA-03000-2
EQG-06800A-9	EQH-06800A-9	EQR-06800A-9	EQT-06800A-9	EKA-2400-2	EKE-4000-2	EKT-1300-2	EMA-03000-5
EQG-09900A-5	EQH-09900A-5	EQR-09900A-5	EQT-09900A-5	EKA-2400-5	EKE-4000-5	EKT-1500-2	EMA-04300-2
EQG-09900A-9	EQH-09900A-9	EQR-09900A-9	EQT-09900A-9	EKA-3000-2	EKE-5000-2	EKT-1700-2	EMA-04300-5
EQG-11600A-5	EQH-11600A-5	EQR-11600A-5	EQT-11600A-5	EKA-3000-5	EKE-5000-5	EKT-1700-5	EMA-05100-2
EQG-11600A-9	EQH-11600A-9	EQR-11600A-9	EQT-11600A-9	EKA-3600-2	EKE-6000-2	EKT-2000-2	EMA-05100-5
EQG-13600A-5	EQH-13600A-5	EQR-13600A-5	EQT-13600A-5	EKA-3600-5	EKE-6000-5	EKT-2000-5	EMA-06000-2
EQG-13600A-9	EQH-13600A-9	EQR-13600A-9	EQT-13600A-9	EKA-4200-2	EKR-1300-2	EKT-2200-2	EMA-06000-5
EQG-17500A-5	EQH-17500A-5	EQR-17500A-5	EQT-17500A-5	EKA-4200-5	EKR-1500-2	EKT-2200-5	EMA-07650-2
EQG-17500A-9	EQH-17500A-9	EQR-17500A-9	EQT-17500A-9	EKA-5400-2	EKR-1700-2	EKT-2900-2	EMA-07650-5
EQG-20400A-5	EQH-20400A-5	EQR-20400A-5	EQT-20400A-5	EKA-5400-5	EKR-1700-5	EKT-2900-5	EMA-09000-2
EQG-20400A-9	EQH-20400A-9	EQR-20400A-9	EQT-20400A-9	EKA-6300-2	EKR-2000-2	EKT-3400-2	EMA-09000-5
EQG-23400A-5	EQH-23400A-5	EQR-23400A-5	EQT-23400A-5	EKA-6300-5	EKR-2000-5	EKT-3400-5	EMA-10200-2
EQG-23400A-9	EQH-23400A-9	EQR-23400A-9	EQT-23400A-9	EKE-1300-2	EKR-2200-2	EKT-4000-2	EMA-10200-5
EQG-26500A-5	EQH-26500A-5	EQR-26500A-5	EQT-26500A-5	EKE-1500-2	EKR-2200-5	EKT-4000-5	EMA-12000-2
EQG-26500A-9	EQH-26500A-9	EQR-26500A-9	EQT-26500A-9	EKE-1700-2	EKR-2900-2	EKT-5000-2	EMA-12000-5
EQG-34200A-5	EQH-34200A-5	EQR-34200A-5	EQT-34200A-5	EKE-1700-5	EKR-2900-5	EKT-5000-5	EMA-16100-5
EQG-34200A-9	EQH-34200A-9	EQR-34200A-9	EQT-34200A-9	EKE-2000-2	EKR-3400-2	EKT-6000-2	
EQG-44400A-5	EQH-44400A-5	EQR-44400A-5	EQT-44400A-5	EKE-2000-5	EKR-3400-5	EKT-6000-5	
EQG-44400A-9	EQH-44400A-9	EQR-44400A-9	EQT-44400A-9	EKE-2200-2	EKR-4000-2		
EME-02000-2	EME-07200-5	EMG-04000-2	EMH-11600-5	EMH-07200-2	EMR-02900-5	EMR-11600-2	EMT-05800-5
EME-02000-5	EME-08700-2	EMG-04000-5	EMH-02000-2	EMH-07200-5	EMR-04000-2	EMR-11600-5	EMT-07200-2
EME-02400-2	EME-08700-5	EMG-04800-2	EMH-02000-5	EMH-08700-2	EMR-04000-5	EMT-02000-2	EMT-07200-5
EME-02400-5	EME-09600-2	EMG-04800-5	EMH-02400-2	EMH-08700-5	EMR-04800-2	EMT-02000-5	EMT-08700-2
EME-02900-2	EME-09600-5	EMG-05800-2	EMH-02400-5	EMH-09600-2	EMR-04800-5	EMT-02400-2	EMT-08700-5
EME-02900-5	EME-11600-2	EMG-05800-5	EMH-02900-2	EMH-09600-5	EMR-05800-2	EMT-02400-5	EMT-09600-2
EME-04000-2	EME-11600-5	EMG-07200-2	EMH-02900-5	EMH-11600-2	EMR-05800-5	EMT-02900-2	EMT-09600-5
EME-04000-5	EMG-02000-2	EMG-07200-5	EMH-04000-2	EMH-11600-5	EMR-07200-2	EMT-02900-5	EMT-11600-2
EME-04800-2	EMG-02000-5	EMG-08700-2	EMH-04000-5	EMR-02000-2	EMR-07200-5	EMT-04000-2	EMT-11600-5
EME-04800-5	EMG-02400-2	EMG-08700-5	EMH-04800-2	EMR-02000-5	EMR-08700-2	EMT-04000-5	
EME-05800-2	EMG-02400-5	EMG-09600-2	EMH-04800-5	EMR-02400-2	EMR-08700-5	EMT-04800-2	
EME-05800-5	EMG-02900-2	EMG-09600-5	EMH-05800-2	EMR-02400-5	EMR-09600-2	EMT-04800-5	
EME-07200-2	EMG-02900-5	EMG-11600-2	EMH-05800-5	EMR-02900-2	EMR-09600-5	EMT-05800-2	

(2) The alternate test procedure for the RefPlus basic models identified in paragraph (1) of this Interim Waiver Order is the test procedure for walk-in cooler and walk-in freezer refrigeration systems prescribed by DOE at 10 CFR part 431, subpart R, appendix C (“Appendix C”), except that the liquid inlet saturation temperature test condition and liquid inlet subcooling temperature test condition shall be modified to 38 °F and 5 °F, respectively, for both walk-in refrigerator unit coolers and walk-in freezer unit coolers, as detailed below. All other requirements of Appendix C and DOE’s regulations remain applicable.

In Appendix C, under section 3.1. *General modifications: Test Conditions and Tolerances*, revise section 3.1.5., to read as follows:

3.1.5. Tables 15 and 16 shall be modified to read as follows:

TABLE 15—REFRIGERATOR UNIT COOLER

Test description	Unit cooler air entering dry-bulb, °F	Unit cooler air entering relative humidity, %	Saturated suction temp, °F	Liquid inlet saturation temp, °F	Liquid inlet subcooling temp, °F	Compressor capacity	Test objective
Off Cycle Fan Power	35	<50	—	—	—	Compressor Off	Measure fan input power during compressor off cycle.
Refrigeration Capacity Suction A	35	<50	25	38	5	Compressor On	Determine Net Refrigeration Capacity of Unit Cooler.

Note: Superheat to be set according to equipment specification in equipment or installation manual. If no superheat specification is given, a default superheat value of 6.5 °F shall be used. The superheat setting used in the test shall be reported as part of the standard rating.

TABLE 16—FREEZER UNIT COOLER

Test description	Unit cooler air entering dry-bulb, °F	Unit cooler air entering relative humidity, %	Saturated suction temp, °F	Liquid inlet saturation temp, °F	Liquid inlet subcooling temp, °F	Compressor capacity	Test objective
Off Cycle Fan Power	−10	<50	—	—	—	Compressor Off	Measure fan input power during compressor off cycle.
Refrigeration Capacity Suction A	−10	<50	−20	38	5	Compressor On	Determine Net Refrigeration Capacity of Unit Cooler.
Defrost	−10	Various	—	—	—	Compressor Off	Test according to Appendix C Section C11.

Note: Superheat to be set according to equipment specification in equipment or installation manual. If no superheat specification is given, a default superheat value of 6.5 °F shall be used. The superheat setting used in the test shall be reported as part of the standard rating.

(3) *Representations.* RefPlus may not make representations about the energy efficiency of a basic model listed in paragraph (1) for compliance, marketing, or other purposes unless that basic model has been tested in accordance with the provisions set forth in this alternate test procedure and such representations fairly disclose the results of such testing.

(4) This Interim Waiver Order shall remain in effect according to the provisions of 10 CFR 431.401.

(5) This Interim Waiver Order is issued on the condition that the statements, representations, test data, and documentary materials provided by RefPlus are valid. If RefPlus makes any modifications to the controls or configurations of a basic model subject to this Interim Waiver

Order, such modifications will render the waiver invalid with respect to that basic model, and RefPlus will either be required to use the current Federal test method or submit a new application for a test procedure waiver. DOE may rescind or modify this waiver at any time if it determines the factual basis underlying the petition for the Interim Waiver Order is incorrect, or the results from the alternate test procedure are unrepresentative of the basic model's true energy consumption characteristics. 10 CFR 431.401(k)(1). Likewise, RefPlus may request that DOE rescind or modify the Interim Waiver Order if RefPlus discovers an error in the information provided to DOE as part of its petition, determines that the interim waiver is no longer needed, or for other appropriate reasons. 10 CFR 431.401(k)(2).

(6) Issuance of this Interim Waiver Order does not release RefPlus from the applicable requirements set forth at 10 CFR part 429.

DOE makes decisions on waivers and interim waivers for only those basic models specifically set out in the petition, not future models that may be manufactured by the petitioner. RefPlus may submit a new or amended petition for waiver and request for grant of interim waiver, as appropriate, for additional basic models of CO₂ direct expansion unit coolers. Alternatively, if appropriate, RefPlus may request that DOE extend the scope of a waiver or an interim waiver to include additional basic models employing the same technology as the basic model(s) set forth in the original petition consistent with 10 CFR 431.401(g).

Signing Authority

This document of the Department of Energy was signed on August 3, 2021, by Kelly Speakes-Backman, Principal Deputy Assistant Secretary and Acting Assistant Secretary for Energy Efficiency and Renewable Energy, pursuant to delegated authority from the Secretary of Energy.

That document with the original signature and date is maintained by DOE. For administrative purposes only, and in compliance with requirements of the Office of the Federal Register, the undersigned DOE Federal Register Liaison Officer has been authorized to sign and submit the document in electronic format for publication, as an official document of the Department of Energy. This administrative process in no way alters the legal effect of this document upon publication in the *Federal Register*.

Signed in Washington, DC, on August 5, 2021.

Treena V. Garrett,
Federal Register Liaison Officer,
U.S. Department of Energy.

Application for Interim Waiver

Request for Interim Waiver from a DOE test procedure pursuant to provisions described in 10 CFR 431.401 for the following product on the grounds that “the basic model contains one or more design characteristics that prevent testing of the basic model according to the prescribed test procedures.”

CO2 Direct Expansion Unit Coolers in Medium and Low Temperature



The design characteristics constituting the grounds for the Interim Waiver Application:

- Appendix C to Subpart R of Part 431 – Uniform Test Method for the Measurement of Net Capacity and AWEF of Walk-in Cooler and Walk-in Freezer Refrigeration Systems specifies that unit coolers tested alone use the test procedures described in AHRI 1250-2009. Table 15 and Table 16 of AHRI 1250-2009 are as follows:

Test description	Unit cooler air entering dry-bulb, °F	Unit cooler air entering relative humidity, %	Saturated suction temp, °F	Liquid inlet saturation temp, °F	Liquid inlet subcooling temp, °F	Compressor capacity	Test objective
Off Cycle Fan Power	35	<50	—	—	—	Compressor Off	Measure fan input power during compressor off cycle.
Refrigeration Capacity Suction A	35	<50	25	105	9	Compressor On	Determine Net Refrigeration Capacity of Unit Cooler.
Refrigeration Capacity Suction B	35	<50	20	105	9	Compressor On	Determine Net Refrigeration Capacity of Unit Cooler.

Test description	Unit cooler air entering dry-bulb, °F	Unit cooler air entering relative humidity, %	Saturated suction temp, °F	Liquid inlet saturation temp, °F	Liquid inlet subcooling temp, °F	Compressor capacity	Test objective
Off Cycle Fan Power	-10	<50	—	—	—	Compressor Off	Measure fan input power during compressor off cycle.
Refrigeration Capacity Suction A	-10	<50	-20	105	9	Compressor On	Determine Net Refrigeration Capacity of Unit Cooler.
Refrigeration Capacity Suction B	-10	<50	-26	105	9	Compressor On	Determine Net Refrigeration Capacity of Unit Cooler.
Defrost	-10	Various	—	—	—	Compressor Off	Test according to Appendix C Section C11.

- CO2 refrigerant has a critical temperature of 87.8°F thus the liquid inlet saturation temperature of 105°F and the liquid inlet subcooling temperature of 9°F as specified in Table 15 and Table 16 are not achievable.
- The test condition values need to be more inline with typical operating conditions for a CO2 refrigeration application

Basic Models on which the Interim Waiver is being requested:

LAA-0607-1	LAE-0577-2	LAG-0577-1	LAH-0577-1	LPA-0607-1	LPE-0577-2	LPG-0577-1	LPH-0577-1
LAA-0607-2	LAE-0577-5	LAG-0577-2	LAH-0577-2	LPA-0607-2	LPE-0577-5	LPG-0577-2	LPH-0577-2
LAA-0757-1	LAE-0727-2	LAG-0727-1	LAH-0727-1	LPA-0707-1	LPE-0677-2	LPG-0677-1	LPH-0677-1
LAA-0757-2	LAE-0727-5	LAG-0727-2	LAH-0727-2	LPA-0707-2	LPE-0677-5	LPG-0677-2	LPH-0677-2
LAA-0957-1	LAE-0907-2	LAG-0907-1	LAH-0907-1	LPA-0807-1	LPE-0767-2	LPG-0767-1	LPH-0767-1
LAA-0957-2	LAE-0907-5	LAG-0907-2	LAH-0907-2	LPA-0807-2	LPE-0767-5	LPG-0767-2	LPH-0767-2
LAA-1207-1	LAE-1147-2	LAG-1147-1	LAH-1147-1	LPA-1007-1	LPE-0957-2	LPG-0957-1	LPH-0957-1
LAA-1207-2	LAE-1147-5	LAG-1147-2	LAH-1147-2	LPA-1007-2	LPE-0957-5	LPG-0957-2	LPH-0957-2
LAA-1507-1	LAE-1437-2	LAG-1437-1	LAH-1437-1	LPA-1207-1	LPE-1157-2	LPG-1157-1	LPH-1157-1
LAA-1507-2	LAE-1437-5	LAG-1437-2	LAH-1437-2	LPA-1207-2	LPE-1157-5	LPG-1157-2	LPH-1157-2
LAA-1807-1	LAE-1707-2	LAG-1707-1	LAH-1707-1	LPA-1607-1	LPE-1527-2	LPG-1527-1	LPH-1527-1
LAA-1807-2	LAE-1707-5	LAG-1707-2	LAH-1707-2	LPA-1607-2	LPE-1527-5	LPG-1527-2	LPH-1527-2
LAA-2407-1	LAE-2307-2	LAG-2307-1	LAH-2307-1	LPA-2007-1	LPE-1907-2	LPG-1907-1	LPH-1907-1
LAA-2407-2	LAE-2307-5	LAG-2307-2	LAH-2307-2	LPA-2007-2	LPE-1907-5	LPG-1907-2	LPH-1907-2
LAA-2807-1	LAE-2707-2	LAG-2707-1	LAH-2707-1	LPA-2107-1	LPE-2007-2	LPG-2007-1	LPH-2007-1
LAA-2807-2	LAE-2707-5	LAG-2707-2	LAH-2707-2	LPA-2107-2	LPE-2007-5	LPG-2007-2	LPH-2007-2
LAA-3007-1	LAE-2867-2	LAG-2867-1	LAH-2867-1	LPA-2407-1	LPE-2307-2	LPG-2307-1	LPH-2307-1

LAA-3007-2	LAE-2867-5	LAG-2867-2	LAH-2867-2	LPA-2407-2	LPE-2307-5	LPG-2307-2	LPH-2307-2
LAA-3607-1	LAE-3437-2	LAG-3437-1	LAH-3437-1	LPA-2807-1	LPE-2707-2	LPG-2707-1	LPH-2707-1
LAA-3607-2	LAE-3437-5	LAG-3437-2	LAH-3437-2	LPA-2807-2	LPE-2707-5	LPG-2707-2	LPH-2707-2
LAA-4207-1	LAE-4007-2	LAG-4007-1	LAH-4007-1	LPA-3507-1	LPE-3347-2	LPG-3347-1	LPH-3347-1
LAA-4207-2	LAE-4007-5	LAG-4007-2	LAH-4007-2	LPA-3507-2	LPE-3347-5	LPG-3347-2	LPH-3347-2
LAA-4607-1	LAE-4387-2	LAG-4387-1	LAH-4387-1	LPA-4207-1	LPE-4007-2	LPG-4007-1	LPH-4007-1
LAA-4607-2	LAE-4387-5	LAG-4387-2	LAH-4387-2	LPA-4207-2	LPE-4007-5	LPG-4007-2	LPH-4007-2
LSA-0457-1	LSE-0437-2	LSR-0437-1	LST-0437-1	LVA-0707-1	LVA-3607-2	LVG-0707-1	LVH-0707-1
LSA-0457-2	LSE-0437-5	LSR-0437-2	LST-0437-2	LVA-0707-2	LVA-3607-5	LVG-0707-2	LVH-0707-2
LSA-0557-1	LSE-0527-2	LSR-0527-1	LST-0527-1	LVA-0707-5	LVA-4207-1	LVG-0807-1	LVH-0807-1
LSA-0557-2	LSE-0527-5	LSR-0527-2	LST-0527-2	LVA-0807-1	LVA-4207-2	LVG-0807-2	LVH-0807-2
LSA-0657-1	LSE-0627-2	LSR-0627-1	LST-0627-1	LVA-0807-2	LVA-4207-5	LVG-0907-1	LVH-0907-1
LSA-0657-2	LSE-0627-5	LSR-0627-2	LST-0627-2	LVA-0807-5	LVE-0707-2	LVG-0907-2	LVH-0907-2
LSA-0757-1	LSE-0727-2	LSR-0727-1	LST-0727-1	LVA-0907-1	LVE-0707-5	LVG-1207-1	LVH-1207-1
LSA-0757-2	LSE-0727-5	LSR-0727-2	LST-0727-2	LVA-0907-2	LVE-0807-2	LVG-1207-2	LVH-1207-2
LSA-0927-1	LSE-0887-2	LSR-0887-1	LST-0887-1	LVA-0907-5	LVE-0807-5	LVG-1507-1	LVH-1507-1
LSA-0927-2	LSE-0887-5	LSR-0887-2	LST-0887-2	LVA-1207-1	LVE-0907-2	LVG-1507-2	LVH-1507-2
LSA-1087-1	LSE-1037-2	LSR-1037-1	LST-1037-1	LVA-1207-2	LVE-0907-5	LVG-1907-1	LVH-1907-1
LSA-1087-2	LSE-1037-5	LSR-1037-2	LST-1037-2	LVA-1207-5	LVE-1207-2	LVG-1907-2	LVH-1907-2
LSA-1307-1	LSE-1247-2	LSR-1247-1	LST-1247-1	LVA-1507-1	LVE-1207-5	LVG-2407-1	LVH-2407-1
LSA-1307-2	LSE-1247-5	LSR-1247-2	LST-1247-2	LVA-1507-2	LVE-1507-2	LVG-2407-2	LVH-2407-2
LSA-1407-1	LSE-1337-2	LSR-1337-1	LST-1337-1	LVA-1507-5	LVE-1507-5	LVG-2707-1	LVH-2707-1
LSA-1407-2	LSE-1337-5	LSR-1337-2	LST-1337-2	LVA-1907-1	LVE-1907-2	LVG-2707-2	LVH-2707-2
LSA-1607-1	LSE-1527-2	LSR-1527-1	LST-1527-1	LVA-1907-2	LVE-1907-5	LVG-3007-1	LVH-3007-1
LSA-1607-2	LSE-1527-5	LSR-1527-2	LST-1527-2	LVA-1907-5	LVE-2407-2	LVG-3007-2	LVH-3007-2
LSA-1907-1	LSE-1807-2	LSR-1807-1	LST-1807-1	LVA-2407-1	LVE-2407-5	LVG-3607-1	LVH-3607-1
LSA-1907-2	LSE-1807-5	LSR-1807-2	LST-1807-2	LVA-2407-2	LVE-2707-2	LVG-3607-2	LVH-3607-2
LSA-2307-1	LSE-2207-2	LSR-2207-1	LST-2207-1	LVA-2407-5	LVE-2707-5	LVG-4207-1	LVH-4207-1
LSA-2307-2	LSE-2207-5	LSR-2207-2	LST-2207-2	LVA-2707-1	LVE-2707-8	LVG-4207-2	LVH-4207-2
LSA-2607-1	LSE-2407-2	LSR-2407-1	LST-2407-1	LVA-2707-2	LVE-2707-9		
LSA-2607-2	LSE-2407-5	LSR-2407-2	LST-2407-2	LVA-2707-5	LVE-3007-2		
LSA-3207-1	LSE-3007-2	LSR-3007-1	LST-3007-1	LVA-3007-1	LVE-3007-5		
LSA-3207-2	LSE-3007-5	LSR-3007-2	LST-3007-2	LVA-3007-2	LVE-3607-2		
LSA-3907-1	LSE-3707-2	LSR-3707-1	LST-3707-1	LVA-3007-5	LVE-3607-5		
LSA-3907-2	LSE-3707-5	LSR-3707-2	LST-3707-2	LVA-3607-1	LVE-4207-2		
					LVE-4207-5		
EJA-02600A-5	EJE-02500A-5	EJG-02600A-5	EJH-02600A-5	EJR-02600A-5	EJT-02600A-5	EQA-04900A-5	EQE-04800A-5
EJA-02600A-9	EJE-02500A-9	EJG-02600A-9	EJH-02600A-9	EJR-02600A-9	EJT-02600A-9	EQA-04900A-9	EQE-04800A-9
EJA-03200A-5	EJE-03100A-5	EJG-03200A-5	EJH-03200A-5	EJR-03200A-5	EJT-03200A-5	EQA-05800A-5	EQE-05700A-5
EJA-03200A-9	EJE-03100A-9	EJG-03200A-9	EJH-03200A-9	EJR-03200A-9	EJT-03200A-9	EQA-05800A-9	EQE-05700A-9
EJA-03800A-5	EJE-03700A-5	EJG-03800A-5	EJH-03800A-5	EJR-03800A-5	EJT-03800A-5	EQA-06800A-5	EQE-06700A-5
EJA-03800A-9	EJE-03700A-9	EJG-03800A-9	EJH-03800A-9	EJR-03800A-9	EJT-03800A-9	EQA-06800A-9	EQE-06700A-9
EJA-05200A-5	EJE-05100A-5	EJG-05200A-5	EJH-05200A-5	EJR-05200A-5	EJT-05200A-5	EQA-09900A-5	EQE-09600A-5
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EJA-06300A-5	EJE-06200A-5	EJG-06300A-5	EJH-06300A-5	EJR-06300A-5	EJT-06300A-5	EQA-11600A-5	EQE-11500A-5
EJA-06300A-9	EJE-06200A-9	EJG-06300A-9	EJH-06300A-9	EJR-06300A-9	EJT-06300A-9	EQA-11600A-9	EQE-11500A-9
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EJA-07700A-9	EJE-07600A-9	EJG-07700A-9	EJH-07700A-9	EJR-07700A-9	EJT-07700A-9	EQA-13600A-9	EQE-13400A-9
EJA-09500A-5	EJE-09300A-5	EJG-09500A-5	EJH-09500A-5	EJR-09500A-5	EJT-09500A-5	EQA-17500A-5	EQE-17200A-5

EJA-09500A-9	EJE-09300A-9	EJG-09500A-9	EJH-09500A-9	EJR-09500A-9	EJT-09500A-9	EQA-17500A-9	EQE-17200A-9
EJA-11600A-5	EJE-11500A-5	EJG-11600A-5	EJH-11600A-5	EJR-11600A-5	EJT-11600A-5	EQA-20400A-5	EQE-20300A-5
EJA-11600A-9	EJE-11500A-9	EJG-11600A-9	EJH-11600A-9	EJR-11600A-9	EJT-11600A-9	EQA-20400A-9	EQE-20300A-9
EJA-12700A-5	EJE-15300A-5	EJG-12700A-5	EJH-12700A-5	EJR-12700A-5	EJT-12700A-5	EQA-23400A-5	EQE-26800A-5
EJA-12700A-9	EJE-15300A-9	EJG-12700A-9	EJH-12700A-9	EJR-12700A-9	EJT-12700A-9	EQA-23400A-9	EQE-26800A-9
EJA-15400A-5	EJE-19000A-5	EJG-15400A-5	EJH-15400A-5	EJR-15400A-5	EJT-15400A-5	EQA-26500A-5	EQE-33700A-5
EJA-15400A-9	EJE-19000A-9	EJG-15400A-9	EJH-15400A-9	EJR-15400A-9	EJT-15400A-9	EQA-26500A-9	EQE-33700A-9
EJA-19400A-5		EJG-19400A-5	EJH-19400A-5	EJR-19400A-5	EJT-19400A-5	EQA-34200A-5	
EJA-19400A-9		EJG-19400A-9	EJH-19400A-9	EJR-19400A-9	EJT-19400A-9	EQA-34200A-9	
EJA-21000A-5		EJG-21000A-5	EJH-21000A-5	EJR-21000A-5	EJT-21000A-5	EQA-44400A-5	
EJA-21000A-9		EJG-21000A-9	EJH-21000A-9	EJR-21000A-9	EJT-21000A-9	EQA-44400A-9	

EQG-04900A-5	EQH-04900A-5	EQR-04900A-5	EQT-04900A-5	EKA-1400-2	EKE-2200-5	EKR-4000-5	EMA-02150-2
EQG-04900A-9	EQH-04900A-9	EQR-04900A-9	EQT-04900A-9	EKA-1600-2	EKE-2900-2	EKR-5000-2	EMA-02150-5
EQG-05800A-5	EQH-05800A-5	EQR-05800A-5	EQT-05800A-5	EKA-1800-2	EKE-2900-5	EKR-5000-5	EMA-02550-2
EQG-05800A-9	EQH-05800A-9	EQR-05800A-9	EQT-05800A-9	EKA-2100-2	EKE-3400-2	EKR-6000-2	EMA-02550-5
EQG-06800A-5	EQH-06800A-5	EQR-06800A-5	EQT-06800A-5	EKA-2100-5	EKE-3400-5	EKR-6000-5	EMA-03000-2
EQG-06800A-9	EQH-06800A-9	EQR-06800A-9	EQT-06800A-9	EKA-2400-2	EKE-4000-2	EKT-1300-2	EMA-03000-5
EQG-09900A-5	EQH-09900A-5	EQR-09900A-5	EQT-09900A-5	EKA-2400-5	EKE-4000-5	EKT-1500-2	EMA-04300-2
EQG-09900A-9	EQH-09900A-9	EQR-09900A-9	EQT-09900A-9	EKA-3000-2	EKE-5000-2	EKT-1700-2	EMA-04300-5
EQG-11600A-5	EQH-11600A-5	EQR-11600A-5	EQT-11600A-5	EKA-3000-5	EKE-5000-5	EKT-1700-5	EMA-05100-2
EQG-11600A-9	EQH-11600A-9	EQR-11600A-9	EQT-11600A-9	EKA-3600-2	EKE-6000-2	EKT-2000-2	EMA-05100-5
EQG-13600A-5	EQH-13600A-5	EQR-13600A-5	EQT-13600A-5	EKA-3600-5	EKE-6000-5	EKT-2000-5	EMA-06000-2
EQG-13600A-9	EQH-13600A-9	EQR-13600A-9	EQT-13600A-9	EKA-4200-2	EKR-1300-2	EKT-2200-2	EMA-06000-5
EQG-17500A-5	EQH-17500A-5	EQR-17500A-5	EQT-17500A-5	EKA-4200-5	EKR-1500-2	EKT-2200-5	EMA-07650-2
EQG-17500A-9	EQH-17500A-9	EQR-17500A-9	EQT-17500A-9	EKA-5400-2	EKR-1700-2	EKT-2900-2	EMA-07650-5
EQG-20400A-5	EQH-20400A-5	EQR-20400A-5	EQT-20400A-5	EKA-5400-5	EKR-1700-5	EKT-2900-5	EMA-09000-2
EQG-20400A-9	EQH-20400A-9	EQR-20400A-9	EQT-20400A-9	EKA-6300-2	EKR-2000-2	EKT-3400-2	EMA-09000-5
EQG-23400A-5	EQH-23400A-5	EQR-23400A-5	EQT-23400A-5	EKA-6300-5	EKR-2000-5	EKT-3400-5	EMA-10200-2
EQG-23400A-9	EQH-23400A-9	EQR-23400A-9	EQT-23400A-9	EKE-1300-2	EKR-2200-2	EKT-4000-2	EMA-10200-5
EQG-26500A-5	EQH-26500A-5	EQR-26500A-5	EQT-26500A-5	EKE-1500-2	EKR-2200-5	EKT-4000-5	EMA-12000-2
EQG-26500A-9	EQH-26500A-9	EQR-26500A-9	EQT-26500A-9	EKE-1700-2	EKR-2900-2	EKT-5000-2	EMA-12000-5
EQG-34200A-5	EQH-34200A-5	EQR-34200A-5	EQT-34200A-5	EKE-1700-5	EKR-2900-5	EKT-5000-5	EMA-16100-5
EQG-34200A-9	EQH-34200A-9	EQR-34200A-9	EQT-34200A-9	EKE-2000-2	EKR-3400-2	EKT-6000-2	
EQG-44400A-5	EQH-44400A-5	EQR-44400A-5	EQT-44400A-5	EKE-2000-5	EKR-3400-5	EKT-6000-5	
EQG-44400A-9	EQH-44400A-9	EQR-44400A-9	EQT-44400A-9	EKE-2200-2	EKR-4000-2		

EME-02000-2	EME-07200-5	EMG-04000-2	EMG-11600-5	EMH-07200-2	EMR-02900-5	EMR-11600-2	EMT-05800-5
EME-02000-5	EME-08700-2	EMG-04000-5	EMH-02000-2	EMH-07200-5	EMR-04000-2	EMR-11600-5	EMT-07200-2
EME-02400-2	EME-08700-5	EMG-04800-2	EMH-02000-5	EMH-08700-2	EMR-04000-5	EMT-02000-2	EMT-07200-5
EME-02400-5	EME-09600-2	EMG-04800-5	EMH-02400-2	EMH-08700-5	EMR-04800-2	EMT-02000-5	EMT-08700-2
EME-02900-2	EME-09600-5	EMG-05800-2	EMH-02400-5	EMH-09600-2	EMR-04800-5	EMT-02400-2	EMT-08700-5
EME-02900-5	EME-11600-2	EMG-05800-5	EMH-02900-2	EMH-09600-5	EMR-05800-2	EMT-02400-5	EMT-09600-2
EME-04000-2	EME-11600-5	EMG-07200-2	EMH-02900-5	EMH-11600-2	EMR-05800-5	EMT-02900-2	EMT-09600-5
EME-04000-5	EMG-02000-2	EMG-07200-5	EMH-04000-2	EMH-11600-5	EMR-07200-2	EMT-02900-5	EMT-11600-2
EME-04800-2	EMG-02000-5	EMG-08700-2	EMH-04000-5	EMR-02000-2	EMR-07200-5	EMT-04000-2	EMT-11600-5
EME-04800-5	EMG-02400-2	EMG-08700-5	EMH-04800-2	EMR-02000-5	EMR-08700-2	EMT-04000-5	
EME-05800-2	EMG-02400-5	EMG-09600-2	EMH-04800-5	EMR-02400-2	EMR-08700-5	EMT-04800-2	
EME-05800-5	EMG-02900-2	EMG-09600-5	EMH-05800-2	EMR-02400-5	EMR-09600-2	EMT-04800-5	
EME-07200-2	EMG-02900-5	EMG-11600-2	EMH-05800-5	EMR-02900-2	EMR-09600-5	EMT-05800-2	

All these basic models with brand name: RefPlus

Specific Requirements sought to be waived – Petitioning for a waiver and interim waiver to exempt CO2 Direct Expansion Unit Coolers in Medium and Low Temperature application from being tested to the current test procedure. The prescribed test procedure is not appropriate for these products for the reasons stated previously (liquid inlet saturation temperature and liquid inlet subcooling temperature test condition values are not appropriate for a transcritical CO2 booster system application).

List of manufacturers of all other basic models marketing in the United States and known to the petitioner to incorporate similar design characteristics –

Manufacturer: Heatcraft Refrigeration Products
Manufacturer: Heat Transfer Products Group (HTPG)
Manufacturer: Hussmann Corp. (Krack)
Manufacturer: Keeprite Refrigeration

Proposed alternate test procedure

1. Utilize the test procedure as outlined in Appendix C to Subpart R of Part 431 – Uniform Test Method for the Measurement of Net Capacity and AWEF of Walk-in Cooler and Walk-in Freezer Refrigeration Systems with reference to AHRI 1250-2009 with the exception of modifying the test conditions in Table 15 and 16 for liquid inlet saturation temperature and liquid inlet subcooling temperature as noted below. In addition, per Appendix C to Subpart R of 431 use the calculations in AHRI 1250 section 7.9 to determine AWEF and net capacity for unit coolers matched to parallel rack systems. Use AHRI 1250 Table 17, EER for Remote Commercial Refrigerated Display Merchandisers and Storage Cabinets to determine the power consumption of the system.

TABLE 15—REFRIGERATOR UNIT COOLER

Test description	Unit cooler air entering dry-bulb, °F	Unit cooler air entering relative humidity, %	Saturated suction temp, °F	CO2 Liquid inlet saturation temp, °F	CO2 Liquid inlet subcooling temp, °F	Compressor capacity	Test objective
Off Cycle Fan Power	35	<50	—	—	—	Compressor Off	Measure fan input power during compressor off cycle.
Refrigeration Capacity Suction A	35	<50	25	38	5	Compressor On	Determine Net Refrigeration Capacity of Unit Cooler.

TABLE 16—FREEZER UNIT COOLER

Test description	Unit cooler air entering dry-bulb, °F	Unit cooler air entering relative humidity, %	Saturated suction temp, °F	CO2 Liquid inlet saturation temp, °F	CO2 Liquid inlet subcooling temp, °F	Compressor capacity	Test objective
Off Cycle Fan Power	-10	<50	—	—	—	Compressor Off	Measure fan input power during compressor off cycle.
Refrigeration Capacity Suction A	-10	<50	-20	38	5	Compressor On	Determine Net Refrigeration Capacity of Unit Cooler.
Defrost	-10	Various	—	—	—	Compressor Off	Test according to Appendix C Section C11.

Success of the application for Interim Waiver will: ensure that manufacturers of CO2 Direct Expansion Unit Coolers in Medium and Low Temperature application can continue to participate in the market

What economic hardship and/or competitive disadvantage is likely to result absent a favorable determination on the Application for Interim Waiver – Economic hardship will be loss of sales due to not meeting the DOE requirements set forth.

Conclusion:

RefPlus Inc. seeks an Interim Waiver from DOE's current requirement to test CO2 direct expansion unit coolers.

Request Submitted by:

/s/

Michel Lecompte

Vice-President, Research & Development
Refplus Inc.

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